TWITCHELL (H.F.)

PLEURITIC EFFUSION: ITS TREATMENT.

A PAPER

READ BEFORE THE

Maine Medical Association,

JUNE 12, 1889,

BY HERBERT F. TWITCHELL, M. D.,
OF FREEPORT.

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PLEURITIC EFFUSION: ITS TREATMENT.

Mr. President, and Gentlemen of the Association:—

The subject to which your attention is called is of unusual importance to all practitioners of our state, because of the frequent occurrence of pleurisy with effusion in this latitude. It is a disease, too, the treatment of which is likely to be attended by a success that is brilliant, or a failure that is lamentable. There are few pathological conditions engaging the skill of the physician, that render him more personal satisfaction or lasting regret, according to the result of his treatment.

The proper treatment of pleuritic effusions has been a bone of contention since the time of Hippocrates; if it has been worn thin ere this, we ought the more easily to get at the marrow.

Believing that all diseases are modified somewhat by the climate and locality in which they occur, believing equally that the experience of the physicians of our own state, as far as it goes, is as valuable as that of the profession elsewhere, we have sought, by a method already known to you, to obtain the combined experience of our Maine physicians in the treatment of this affection.

It is but fair to state that the statistics, which we have received are not absolute; for they are drawn largely from memory, and not from actual records. However, the accompanying correspondence gives free expression of opinions, which have largely determined the conclusions which have been deduced. For the purpose of this paper, it seems necessary to consider effusions under two heads only, hydrothorax and empyema.

Of the 490 cases of effusion collected, 339, or more than 69 per

cent., are cases of hydrothorax; 131 affected the right side, 164 or 55½ per cent., the left, while 44 were not located. There were 319 recoveries and 16 deaths; the remaining 4 cases went on to empyema. This shows a little more than 95 per cent. of recoveries under all methods of treatment; 192 were treated by medical means alone, with 178 cures, and 14 deaths; a recovery of $92\frac{7}{10}$ per cent., against 147 cases treated by aspiration, with 141 cures and 2 deaths; a recovery of $98\frac{6}{10}$ per cent. The four other cases, which became empyemic after this treatment, are not included in the percentage estimate of aspirations, for the reason that similar cases are not included in the estimate of those treated medically.

The time required to accomplish a cure averages about three and one-half months by either method. The most frequent and fatal complication reported is phthisis, occurring sometimes as *cause*, but more often as *effect* of protracted, badly managed cases. Pneumonia is also mentioned frequently; Meningitis, typhoid fever, and other acute affections rarely. Further details are contained in the subjoined table.

TABLE OF SEROUS EFFUSIONS.

Method of Treatment.	Number of Cases.	Left Side.	Right Side.	Not Stated.	Cured.	With Deformity.	Changed to Empyema.	Died.	Percentage of Recoveries.	Complications of Fatal Cases.	Average time for Cure.
Medical,	192	85	72	35	178	6	*	14	$92\frac{7}{10}$	2 pneumonia. 1 phthisis. 1 meningitis. 4 badly treated.	$3\frac{2}{10}$ months.
Aspiration,	147	79	59	9	141	2	4†	2	$98\frac{6}{10}$	1 phthisis.	$3\frac{5}{10}$ months.
Summary,	339	164	131	44	319	8		16	95+	7 cases.	

* For obvious reasons no estimate can be given.

† Two died and two recovered under subsequent treatment by free drainage. They are not included in the calculations of percentage.

A glance at these statistics indicates the advantages of aspiration as a method of treatment; while a careful consideration of the attending facts presents these advantages in a still stronger light. Consider, then, that the ~~radical~~ medical table represents nearly all the cases of slight effusion and those yielding most readily to treatment; while the cases of excessive effusion, and most of those in which medical means proved unsatisfactory or failed altogether, are only considered in the table of aspirations. Cases of serous effusion, treated medically till they become empyemic—a process which nearly all empyemas go through—are not considered in the first group of figures, while those treated by aspiration before this change occurred appear in the second group with startling distinctness. The simpler method of medication naturally cures the most favorable cases, while it sifts out the unpromising and obstinate for a more radical method of treatment.

The opinions expressed in the correspondence accompanying these statistics show that the profession in our state is divided unequally upon three methods of treatment, the majority advising medical treatment exclusively, recommending aspiration only as a last resort, if at all.

The second class, nearly equal in number to the first, advise medical treatment for several weeks—generally from six to eight—then if the case is not progressing favorably, or whenever dyspnœa becomes urgent, a resort to aspiration. The third class has the smallest representation. While recognizing the necessity of medical treatment, they believe in aspiration of all cases where as much as sixteen ounces of fluid have remained for nearly one week without showing a tendency to diminish.

All agree practically upon the medication that should be pursued. It consists in the use externally of blisters or iodine: internally of iodides, diuretics, cathartics and tonics.

As to the management of acute pleurisy, so as to prevent effusion, there are slight differences of opinion. Some use blisters from the first, others wait for the acute symptoms to subside. Many use, but more condemn, such arterial sedatives as aconite and veratrum; ~~and~~ opium, quinine, digitalis, and the simple antifebrifuges are in general use. The practice of strapping or bandag-

ing the chest is only mentioned by a few. Not to weary you with further differences of opinion, we have taken the liberty to deduce from all opinions the following definite outline plan of treatment, when, given a case of acute pleurisy, we hope to bring about resolution without the occurrence of effusion.

If the patient have a strongly acting heart, give ten grains of quinine or antifebrin, and one-fourth grain of morphine, to be repeated the first forty-eight hours as needed: aconite, for the same period of time, two drops every hour. Some object to the use of this drug, while its advocates refer to BARTHOLOW, who says, "For the treatment of acute pleuritis, previous to the stage of effusion, no remedies are more effective than aconite and opium." In case of feebly acting heart, the quinine should be reduced, antifebrin omitted, and digitalis substituted for aconite.

It seems to us that the objections to the use of digitalis in acute inflammations are not well founded; for its known physiological action upon the blood vessels is to a considerable extent antagonistic to the theories of inflammation. Broadly speaking, digitalis assists in sustaining the circulation, and to that extent prevents the deposit of inflammatory products.

In all cases apply immediately a large fly blister. We believe with a prominent member of this society, that "all time is lost time, which is spent in waiting for inflammation to subside." Would those who advise us to withhold blisters in this disease till the acute stage is passed, advise the same delay when acute endo- or peri-carditis arises in the course of rheumatic fever? Yet ~~three~~ membranes, so similar in structure and function, cannot differ widely in pathology.

The kidneys should be moderately stimulated by digitalis, acetate or bitartrate of potash, and the bowels should be freely moved by the use of saline cathartics. Mercury is no longer used as a routine remedy excepting as a purgative. The movements of the chest should be limited by a broad bandage, or by strapping. The patient should be kept perfectly quiet till the danger of effusion is passed. Diet should be sufficiently nutritious from the first, to sustain well the powers of life, and later to improve the general condition.

When a case presents itself where effusion has already occurred, a slight variation from the above plan, if persisted in, will, in nearly all cases, according to the advocates of the medical treatment, suffice for its removal. Externally, blisters are repeated every few days, while the remainder of the side is painted with iodine. Internally, the salines are assisted by croton oil, elaterium, or jalap. Pilocarpine may occasionally be exhibited with advantage; but the diuretics are considered the most important eliminants. Iodide of iron, potash and ammonium are used systematically, and in the order of frequency named. It seems to us that iodide of ammonium has not been given the prominence which it merits. We have found, by personal experience, not only in pleuritic effusions but in many kinds of obstinate indurations, that it is a very potent resolvent. The great importance of improving the patient's general condition is recognized by all, and finds expression in the use of alterative tonics.

Such, in brief, is the skirmish plan of the battle. What a comfort to feel, in case of repulse, that we can summon to our aid the almost invincible aspirator! That it may with advantage be employed earlier in the fight, we hope to show in the closing of this paper.

EMPYEMA.

Empyema, when not traumatic, or possibly of spontaneous origin in children, occurs as a sequel to neglected or badly managed cases of hydrothorax, and rarely from the depravity of the patient's condition. The chief advancement in its treatment, has been in the direction of obtaining a more free and continuous exit for the pus, till now abundant evidence has accumulated to prove that *free drainage* is by far the most successful method. The following statistics from our state verify this statement. We have been furnished with reports of 151 cases, 76 affecting the left side, 54 the right, and 21 not located. Of these, 97 were reported cured and 8 partially cured; while 6 others recovered from the empyema, but died in a few years of

phthisis. This gives recoveries from the immediate disease of 73½ per cent. Of the 40 immediately fatal cases, 14 were complicated, 5 by phthisis, 3 by pulmonary fistula, 2 by inflammation of the lung tissue, and 4 by organic disease of the abdominal organs.

The method of free drainage was employed in 124 cases, yielding recoveries of 78 per cent. Aspiration was employed in 11 cases, yielding recoveries of less than 64 per cent.; while of 16 cases treated with the trocar, or left for spontaneous opening, more than one-half died. The time required to accomplish a cure averages six and one-half months.

TABLE OF EMPYEMAS.

Method of Treatment.	Number of Cases.	Recovered.	Died.	Percentage of Recovery.
Free drainage,	124	97	27	78+
Aspiration,	11	7	4	63+
Spontaneous evacuation,	9	5	4	55+
Trocar puncture without drainage tube,	7	2	5	28+
Summary,	151	111	40	73½

The means for obtaining free drainage almost universally used in our state, is simple incision, carrying a rubber drainage tube. The point selected by 85 per cent. of our physicans to puncture the chest, for aspiration as well as for incision, is the sixth interspace on the right side, the seventh on the left, in the mid-axillary line. Formerly it was thought that the opening should be made in the lowest intercostal spaces, as being more dependent and thereby giving better drainage; but an opening in this situation aside from the dangers of the operation to important structures, would be liable to obstruction from approximation of the costal and diaphragmatic pleuræ, or from agglutination by plastic lymph, which finds a ready lodgment here; while a consideration of the conformity of the chest cavity, as well as clinical experience, shows that an opening in the fifth, sixth or seventh interspace is really the most dependent for a patient in the re-

cumbent position. The drainage tube should enter the cavity far enough to ensure unobstructed exit to the pus. In acute cases a single opening may suffice for a cure, where the pus is contained in one compartment, when it flows out freely at the time of the operation, and especially if the patient is not showing signs of septic absorption; but in chronic cases, if septic symptoms be present, or when adhesive bands have formed multiple compartments, and in pneumo-hydrothorax, one or more counter openings may be required; for success will be assured only when all the matter can find a ready escape. When a cask is to be tapped we are all familiar with the advantage of a counter opening. The empyemic chest presents a fair simile when free expansion of the lung is prevented by adhesive bands.

An excellent and safe method for making the counter puncture has been given by Dr. Satterthwait, in the Medical Record of November 17, 1888, although the method of thorough drainage, belongs essentially to Chassaignac. A metallic seton-carrier, about thirteen inches long, threaded with several strands of silk—which Dr. Satterthwait prefers to a tube—is passed through the first opening into the chest, downward and backward, till it projects between the ribs at the lowest part of the pus cavity. An incision is then made upon the point of the probe, the silk drawn through and left in position for drainage. The percentage of recovery given by those who practice this method is certainly remarkable, although the treatment was applied to the most unpromising cases.

In empyemas of long standing, which have been neglected or badly treated, it is sometimes found that the lung will not expand, and the chest wall must therefore be made to contract. In these cases it may become necessary to excise a portion of one or more ribs, an operation first performed by Celsus and afterward made popular by Estlander. One of the modifications of this operation is especially interesting to this society, having been suggested and practiced by one of its leading members. In his practice it has yielded very satisfactory results. It consists in excising the sternal end of the rib at its juncture with the cartilage.

The practice of washing out the cavity is advised by a number of our correspondents, while the majority consider it unnecessary. It will be found beneficial in cases characterized by unhealthy, offensive discharge, and septic symptoms. The injected fluid should be sterilized water, 105° Fahr., containing carbolic acid, boracic acid, iodine, or other antiseptics in solution.

Are there any cases of empyema amenable to a less radical treatment than free drainage? Years ago Dr. Bowditch, of Boston, proved that some cases could be cured by aspiration, and a few cases are also reported in the above statistics. We ask your indulgence for a somewhat careful report of a case in point, which we believe to be of unusual interest.

Walter B., four and one-half years of age, resides in Pownal, Me., in a somewhat insalubrious locality. He is the youngest of a large family, all of whom are subject to sore throats, swollen glands, auricular abscesses, or other of the various manifestations of congenital strumous diathesis. Walter was only ten months old when his father died of some obscure wasting disease, supposed to be cancer of the stomach. For two months after birth the child suffered with scalled head. He is now of slight frame, light complexion, weak eyes, delicate skin—markedly a "gelatinous offspring of albuminous parents."

I was called on the afternoon of March 10, 1887, and found him in a semi-conscious condition, respiration 60, temperature 105.2, and with a pulse that could not be counted, for rapidity. Distinct dullness on percussion and bronchial breathing over the lower part of the left lung behind, led to a diagnosis of pneumonia, the more readily as an extensive epidemic was then prevailing among children. He did not complain of any pain whatever. Sinapisms of mustard, followed by continuous poulticing, was ordered externally; ipecac, aconite, and spirits of nitre internally. The following morning the pulse was 120, respiration 30, and other symptoms correspondingly improved, excepting that the physical signs of consolidated lung remained the same. Directions were given for a continuance of the external applications, and for one grain of carbonate of ammonium every hour. Two days later, in responding to a sudden

summons, I found the patient unconscious, eye-balls turned far upward and not parallel, pupils oscillating and unequal, head thrown far backward, burrowing into the pillow, while he momentarily uttered piercing screams. Pulse rapid and respiration irregular, but not otherwise noted. Paresis affected the body, extremities and sphincters. The facial expression indicated great suffering.

A diagnosis of meningitis led to a most unfavorable prognosis. However, the following vigorous treatment was instigated, and faithfully carried out by the mother. The head was elevated and constantly enveloped in ice water packs, while dry heat surrounded the feet. A fly blister was applied behind each ear, and mustard to the back of the neck. The bowels were moved by a vigorous calomel purge, while ten grains of bromide of sodium once in four hours, and one and one-half grains of iodide of potassium every hour, were ordered for continuous treatment. Notwithstanding these measures, the symptoms continued unabated for twenty-four hours. Then the outcries diminished and the eye-balls assumed a more natural position; while thirty-six hours later the child was restored to partial consciousness, and the pupils to a nearly normal condition. For a long time the head remained unnaturally extended; but all other cerebral symptoms had passed away by the end of a week. I will state here, in connection with the above symptoms, that ten days later a small abscess formed behind each ear where the blisters had been applied, and one week later still, purulent matter was discharged from each middle ear.

The pulmonary symptoms now reclaimed attention, and it was found that the respiration was still about 40, with a pulse of 150 per minute. There was marked dullness over nearly all the left side behind, and some râles at the top of the dull area. I ordered poultices and systematic painting with iodine externally, one grain of iodide of potash, with one and one-half grains of iodide of ammonium, internally every hour. The child improved gradually till the end of the month—three weeks from the onset of the disease. The respiration was now 32, pulse 120, and temperature 99°. The upper portion of the lung was clear

nearly as low as the angle of the scapula. The slow process of resolution suggested pluritic effusion; but as the two sides seemed alike in measure and fremitus, and as the heart-beat was in the normal position, the idea was dismissed. For the next ten days there was little change; and two days later the patient was decidely worse. The chest was exposed, and a glance only was required to show a condition of hydrothorax. Assisted by my colleague, Dr. Spear, I aspirated at once—just one month from the onset of cerebral symptoms—and obtained thirty ounces of nearly odorless, rather thin, creamy looking pus. Respiration at once diminished from 40 to 30, and the apex of the heart resumed a nearly normal position. A large fly blister was applied to the chest. The child improved rapidly for a month and then unfavorable symptoms returned.

By advice of Dr. Dana and Dr. Weeks, who examined the patient at their Bowdoin clinic, we performed a second aspiration, just five weeks from the first, obtaining twelve ounces of the same kind of pus. Three times during this operation the flow of pus through the aspirator was interrupted by jets of gas, which caused the whole instrument to vibrate. It seemed to come from the surface of the pus; for the needle point did not touch the lung, nor did the patient cough. The apex beat of the heart returned under the xiphoid cartilage only, showing that some adhesions had formed. In pursuance of advice, I determined to instigate free drainage as soon as the child ceased to improve. To my surprise, however, nothing interfered in his progress to health. One week later there was a concavity in the antero-lateral aspect of the chest about as large as my hand. Three weeks later still, the chest was in normal shape, and the heart and lung had resumed their proper position and function. Two years have now passed, during which the child has been in perfect health, and there now remains nothing about him to indicate his former disease.

We see in this case the tendency of serous inflammations to pass from one serosa to another and to complicate inflammation of other tissues. Another striking example of this tendency I have seen in a case when abdominal effusion was followed by

pleuritic, and then by consolidation of each lung. The case also shows the wonderful recuperative power of children; but it is of especial interest in this connection, as showing the possibility of, and the circumstances under which we may expect to cure, empyema by aspiration. It is in the young, then, that we are most likely to obtain this happy result; for they frequently manifest a tendency, as shown by this case, to spontaneous resolution from suppurative processes. Their ribs and cartilages are elastic, permitting the chest wall to fall in, if necessary, and obliterate the cavity, an important mechanical factor in the process of cure.

Cases amenable to this treatment must also be of recent origin and free from septic manifestations. That this mode of treatment should only be selected in suitable cases is proven by the fact now well established, and too often illustrated in our correspondence, that fatal results are frequently due to delay in procuring free drainage.

J. L. Cohen, treating of purulent effusions, makes this statement: "A cure without a free discharge of the fluid, which cannot be obtained by the aspirator alone, is an impossibility." (International Surgery, Vol. V, page 816.)

That this statement is too dogmatic has been proven by Dr. Bowditch, as also by seven cases, including the above, which we have collected from this state. It should, nevertheless, have great weight and make us cautious in our selections for this method of treatment. In nearly all cases, however, aspiration is indicated as an aid in determining the location and character of the fluid, and for the purpose of withdrawing a portion to permit partial expansion of the lung, before the whole is evacuated by a free opening.

This, gentleman, we believe to be the outline-plan of treatment for this affection, suggested by our correspondence with the profession of this state.

Permit us now, in closing, to claim that *early aspiration* is the treatment above all others for *serous pleuritic effusion.* It removes the liquid *at once*, thereby permitting immediate expansion of the lung, and obviating the danger of its becoming bound

back in an unnatural position. In the same way it lessens the danger of empyema; for I think you all will admit that the longer the pleura is macerated in this pathological fluid, the greater the danger of purulent change. The procedure itself favors absorption by substituting the elastic pressure of the lung for the unnatural pressure of the fluid upon the vessels and surface of the pleura.

AGNEW says: "There is reason to believe that we are generally too backward in puncturing the chest for the relief of these collections."

The operation of aspiration is practically *free from danger.* Can we conceive a more thoroughly antiseptic procedure? The disease may afterward advance to empyema; but are we sure that it would not have so resulted in the course of purely medical treatment? If caused by the operation, the fault is in the manipulation and not in the method itself. Dr. BOWDITCH reported, that during 24 years and in 270 operations he had never seen any injury done by the aspirator. (Practitioner of April, 1883.) Regarding reported fatal results from the operations, Bryant says: "Evidences are wanting to prove that any relation existed between reported cases of death from aspiration, since cases are on record in which sudden death ensued in the normal course of the disease." TROUSSEAU mentions numerous cases of sudden death from pleuritic effusion, which, he avers, could undoubtedly have been saved by early paracentesis. One of his colleagues saw a young physician die at the very moment he was about to make the puncture. Had the needle been passed, what might have been the unjust conclusion! In the Reference Hand-book of the Medical Sciences occurs this sentence: "Sudden death was formerly not a very rare event in cases of large effusions, but is now, fortunately, much less common—thanks to the general use of the aspirator."

The majority of our correspondents recommend that aspiration be postponed for an indefinite period of time, unless *oppression* of breathing become urgent. It is now well established that this symptom is hardly ever directly dependent upon the amount of the effusion. TROUSSEAU lost several patients while

waiting for this symptom to develop. This unfortunate experience changed his plan of treatment and led to the following definite statement: "Oppression is one of the most deceitful of signs. * * * * When the oppression is a sign in addition to the physical signs, * * * * it has an important signification; but its absence onght not to inspire too great a feeling of security; for by refraining from interference, we run the risk of losing patients, whom the operation would assuredly have saved."

Aspiration is the method which cures the disease with the *least discomfort* to the patient. The puncture is not likely to cause more annoyance than a simple hypodermic injection. In fact, many physicians, who object to aspiration because of its supposed painfulness or dangers, do not hesitate to explore the chest with the hypodermic syringe, a procedure we cannot too strongly condemn; for the imperfect workmanship, or frequent and indiscriminate use of this instrument, make it liable to be a source of infection. Explore with the aspirator, and then, if desired, make a complete operation. We believe with the author of the following quotation: "It is not worth while to plague the patient by repeated purgings and sweatings, * * * * but apart from prejudice, the discomfort of puncture is really less, and its results are more sure." (Ref. Hand-book of the Medical Sciences, Vol. V, p. 724.)

In substance, gentlemen, early aspiration is likely to cure, and that, too, *quickly, safely, pleasantly.*